156344

Monsanto

FROM (NAME—LOCATION—PHONE) B. J. Sevey CS7L Corporate Engineering (4-6913)

DATE : June 28, 1982

cc: F. A. Mayse - CS7L
W. L. Smull - 1740
R. L. Wiese - CS7R

SUBJECT : CEA 3808 - MAIN SOUTH TRUNK SEWER, W.G.K., LP & EC REVIEW

REFERENCE :

TO :

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J. F. Giblin - F3EB
H. M. Keating - G4WA
K. W. Lichtenheld - CS7L
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Attached is the preliminary PDR for CEA 3808 for your use at the pre-project LP & EC review to be held 9 A.M., July 8, 1982 in Room F-419 of "F" Building at the General Offices.

B. J. Sevey

BJS/kh

Attachment

P.S. I'd like any comments on accuracy, typographical or project content.

WGK 4084968

IN - 10 (REV. 8/77)

Preliminary Project Definition Report

CEA 3808

Main South Trunk Sewer

Monsanto Chemical Intermediates Company

WG Krummrich Plant

June 25, 1982

Approved By

B. J. Sevey Project Manager	R. L. Wiese Manager MCI Engineering
R. L. Nelson Manufacturing Representative	W. L. Smull General Superintendent, TSD.

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CEA 3808

MAIN SOUTH TRUNK SEWER

PRELIMINARY
PROJECT DEFINITION REPORT

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CEA 3808 - MAIN SOUTH SEWER

PRELIMINARY PROJECT DEFINITION REPORT

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I. Project Synopsis

This project will provide a new 42 inch diameter, Monsanto owned, trunk sewer to carry all the plant sewer load now carried by the two Sauget Village sewers. The two existing village sewers are in a very deteriorated condition due to the high acidity of the plant wastes, and require extensive repairs. Repair of the village sewers will be the responsibility of the village.

The new sewer will combine most plant sewer loads into one discharge point where sampling and measuring devices will be provided. The exceptions are sulfuric acid manufacturing, the laboratory and Lot A which discharge into the village sewer on the north side of the plant. The existing south plant sewer system has about nineteen discharge points into the village sewer.

II. Project Results and Commitments

A. Project Results Statements and Priorities

The major result to be realized from this project is to provide a reliable acid proof sewer to handle the plant, sanitary, storm and process, discharges. This will isolate Monsanto's discharges from the other industrial and residential area wastes and provide a single Monsanto discharge which will be monitored. Flows in the village sewers will be reduced so that during heavy rains flooding upstream, in Sauget Village residential areas, will be reduced.

Upstream Sauget Only →

During project execution cost will be of first priority over improved project timing.

B. Products, Capacity and Raw Materials

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1. Products - Not applicable.

2. Capacity - The existing South Trunk Sewers are discharging approximately 27 cfs (12,000 GPM) flowing full. These sewers carry approximately 95% of the main plant discharge.

   The new South Trunk Sewer is planned to be a 42 in. diameter and has a theoretical capacity of 45 cfs (20,000 GPM) at 0.2% slope. For a flat site such as the W. G. Krummrich Plant; it could be assumed that as much as an inch of rain accumulates before runoff would begin. On this basis, the 42 inch sewer would have sufficient capacity to handle a 5 year frequency storm with a 15 minute duration.

II. Project Results and Commitments - continued

The village system downstream from Monsanto's discharge consists of a 42" ∅ sewer under Route 3 and two (2) 36" ∅ sewers from west of Route 3 to the treatment plant.

The flume will be designed to accurately measure flows between 3000 and 8,000 GPM.

3. Raw Materials - Not applicable.

C. Manning, Operability and Maintainability

Sewer construction will be aimed at minimizing maintenance. The sewer will be extra strength vitrified clay tile encased in reinforced concrete to maintain the integrity of the furan resin acid proof joint cement. Manholes will be reinforced concrete with acid proof brick lining. Manholes will be provided at each direction change to provide for easy inspection and cleaning.

Plant manpower will not be effected by this project.

D. Utilities and Energy Conservation

The only utility requirement for this project is electrical power used for heating, ventilating and lighting the sampling house and operating the sampler. (Approximately ____kw maximum.)

"Product Energy Rate" does not apply to this project.

"Energy and Utility Costs for Evaluating Project Capital Alternates" do not apply to this project.

E. Control of Hazards and Environment

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1. Control of Hazards

No new hazards are associated with this project. The composition of the plant effluents are not changed by this project. Prevention of explosive mixtures in the sewer vapor space is currently accomplished at the points of entrance into the plant sewer system and is unchanged by this project.

2. Employe Exposure to Hazardous Materials

This project will not change employe exposure. The sample house will be provided with forced ventilation for use when employes are in the building.

E. Control of Hazards and Environment - continued

3. Environment

This project will reduce the load on the existing village sewers during heavy rainfalls and help to alleviate upstream flooding which occurs from time to time now.

4. Noise

Plant and community noise levels will not be affected.

III. Project Premises

A. Site Location Premises

The new sewer will run westward, roughly following the plant's 5th street from south of building BBO to the village sewer box just east of State Route 3. The new sewer will be north of the two existing village sewers.

Soil conditions vary greatly and can be unstable. Some excavated soil may be unsuitable for backfill. The ground water level is high and fluctuates widely depending on types of soil encountered, the Mississippi River level and rainfall.

B. Process Premises

Not applicable.

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C. Ex-Project Utility Premises

Required utilities can be provided from existing plant sources.

D. Ex-Project Waste Treatment

The new plant sewer will discharge into the Sauget Village sewer system east of State Route 3 and be carried westward to the Sauget Physical/Chemical Treatment Plant for treatment before discharge into the Mississippi River. In the future, after primary/chemical treatment, the effluent will go to the American Bottoms Regional Treatment Facility, expected to be operational in 1986, for secondary treatment.

E. Ex-Project Service Premises

No new service facilities are needed to support this project.

F. Related Projects

A plant project for dismantling building BI, which sits over the sewer routing, needs completion prior to start of new sewer construction.

CEA 3741, ACL waste pre-treatment is expecting approval in July, 1982. The final disposition/design of this project has a direct effect on the branch sewers and manholes required on this project (CEA 3808). This project takes into account current plans for CEA 3741. There is possibility of change.

G. Permits and License Requirements

No discharge permits are required since the new sewer is a replacement sewer and no increase in flow or pollutant loading to the municipal system will result.

Infringements of Village of Sauget right-of-ways must be negotiated with the village by the Plant.

IV. Project Risks

A. Technical Risks

Technical risks are considered minimal on the project. Design and construction will take into account experiences gained on CEA 3088 which replaced many of the main plant sewers.

B. Environmental Risks WGK 4084975

This project is not expected to significantly change any environmental risk. This project will reduce the load on the existing Village of Sauget sewers thus help aleviate potential overload problems during heavy rainfalls.

C. Vulnerability

This project is considered vulnerable to capital deviations since deep excavations will be subject to flooding due to unpredicatable weather and high ground water levels and unstable soils. In preparing the capital estimate conservative estimating factors and higher than normal contingency allowances should be considered to prevent the risk of significant cost overruns. These undefinable costs should be carried as undeveloped design allowances.

D. Likelihood of Changes in Definition

No significant changes in project definition are anticipated.

E. Execution Risks

Soils - A wide variety of soils are expected. Much soil is expected to be of poor quality for use as backfill. Some may be contaminated and require special handling. Excavations will be deep and require extensive shoring. Where soils are particularly unstable or excavation is ajacent to important structures, sheet piling may be required.

Collapse of existing sewer as result of water table lowering.

Ground Water - Extensive dewatering is required. Assuming 200' of open ditch, five 8" ϕ wells at 50' intervals, 50' depth and pumps at 25 hp each, may be required. Two men are required to man the pumps 24 hours/day. Wells will have to be drilled along the entire route as construction progresses. Acidity of ground water may be high in some areas.

The risk of subsidence exists. Test wells are required to monitor and restrict draw down to a reasonable limit.

Acid Proof System - Integrity of the acid proof system will be the lump sum contractors risk. However Monsanto must continually inspect quality.

Underground Obstructions - Underground obstructions and utilities are apt to be encountered. A thorough drawing investigation will be conducted but the risk remains.

V. Project Description WGK 4084976

A. Facility Description

The new sewer will, in general, be parallel and north of the two existing village south trunk sewers. About 1600 lineal feet of 42 inch diameter main trunk sewer pipe will be required. Also, several smaller branch sewers are needed to tie into existing sewers.

Construction will be of extra strength vitrified clay tile encased in reinforced concrete. Joints will be made with Furan resin acid proof cement. Sewer manholes and inlet boxes will be reinforced concrete, fully lined with an acid proof system. Approximately 22 will be needed, about 16 manholes, and about 6 branch inlet boxes.

A. Facility Description - continued

Parshall flume flow measurement and liquid sampling facilities will be provided near the point of discharge into the Sauget Village sewer system.

Design and construction will conform generally with CED Master Specification for Yard Chemical Sewers - Clay Pipe A8.2 STD 3.

A cross connection will be provided at the upstream end of the new sewer to allow the village to divert their flows to the new sewer while they repair their own. At the conclusion of such work the connection would be plugged off.

B. Plot Plans

Preliminary plot plans are included in Appendix A.

VI. Project Strategy

A. Design Strategy

Project design will be in-house by the MCI SPEO group. No pre-approval funding will be requested.

B. Construction, Checkout and Completion Strategy

Construction will be via lump sum union contractors.

Winter weather will be an adverse factor. Furan application is temperature sensitive.

Manholes must be constructed around existing operating sewers. When appropriate the existing sewer is to be broken out of the new manhole and sewage allowed to flow through the new sewer. The old sewer connections would then be permanently plugged.

Where we cannot build around an operating sewer, by-pass pumping between existing manholes will be required.

Some areas of construction will interfere with production, especially around some loading docks. Close coordination is required between the Plant Manufacturing Representative and Construction.

In general, overtime is not required for completion of this project.

B. Construction, Checkout and Completion Strategy -continued

CED has existing, adaquate receiving and storage capability. However, sequential delivery of some items, such as VCP may be advantageous with respect to storage and cash flow.

CED has existing, adaquate temporary construction facilities.

Extensive shoring and dewatering of excavations will be a major construction factor.

Checkout (including leak testing) and start-up will be on a sequential basis. Construction will start at the Route 3 Village of Sauget collection box and proceed east. As sections are completed between major manholes they will be tested and activated. Inflatable bladders will be utilized as temporary pipe plugs.

VII. FACILITIES DESCRIPTION FOR ESTIMATE, SCHEDULE AND CONTROL

Category 01 - Equipment Items (Lichtenheld)
Existing sampling equipment will be relocated. See Category 93.

Category 02 - Instrument Items (Harber)
Existing ultrasonic flow instrumentation will be relocated. See Category 93
New Parshal Flume maximum flow 12,000 GPM. Accurate range 3,000 to 8,000 GPM.

Category 03 - Set & Test Equipment (Lichtenheld)
See Category 93

Category 04 - Set & Test Instruments (Harber)
See Category 93

Category 05 - Piling (Lichtenheld)
None required.

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Category 06 - Excavation (Lichtenheld)

Excavation (for bldg. and misc.)	10 cu. yd.
Backfill, compacted	8 cu. yd.

Category 07 - Foundations (Lichtenheld)

Building slab	2 cu. yd.

Category 08 - Supports, Platforms & Structures (Lichtenheld)
None required.

Category 09 - Other Building Items (Lichtenheld)

Insulated	1 each
1- 3' x 7' mandoor, (2) 8" Ø vent fans	

Category 10 - Sprinklers and Fire Protection (Lichtenheld)
None required.

Category 11 - Piping (Lichtenheld)
None required.

Category 12 - Ductwork (Lichtenheld)
None required.

Category 13 - Electrical (Harber)

1. Set 2 new poles and run about 100' of guy strand and feeder from existing meter house to new meter house for power.
2. Mount electric heater with thermostat, vent fan, new breaker panel and power for sample pump. About 50' conduit.
3. Mount 2 receptacles, 2 fluorescent fixtures, and switch for new meter house. About 50' conduit.
4. Run (2) 2" conduits underground and encased in concrete from new meter house to new manhole with flune. About 75'.

Electrical material (Does not include underground conduit.)	$3500

Category 14 - Site Preparation (Lichtenheld)
None required.

Category 15 - Sewers, Drains, and Plumbing (Lichtenheld)

Excavation	13,500 c.y.
Backfill, compacted (in place)	11,000 c.y.
3" gravel areas	200 tons
Sewers, VCP (extra strenght)	
42"Ø	1,600 L.F.
24"Ø	20 L.F.
18"Ø	25 L.F.
15"Ø	235 L.F.
12"Ø	355 L.F.
8"Ø	300 L.F.
6"Ø	90 L.F.
Concrete encasement, 2 pour, reinforced per Spec. A8.2 STD 9, Figure 5	1,600 c.y.
Concrete manholes, curb inlets, trench	500 c.y.
C.I. frames and grates, heavy duty	27 ea.

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Galvanized trench grating, 1"	20 S.F.
42" flume, 1 ea.	$7,500
Acid brick, for manholes, with Furan joints	8,500 S.F.
Fill 1/4" space behind acid brick with sulfur	
Asphalt membrane, inside and outside manholes	22,000 S.F.
Sewer plugs, concrete	21 ea.
Fiberglass coating on underside of manhole lids	700 S.F.
Sheeting, timber	70,000 S.F.
Sheet piling MP 112, 15' embedment	35,000 S.F.
Structural steel wales and struts reuse 200' sections (5 times)	8 tons

Category 16 - Underground Piping (Lichtenheld)
None required.

Category 17 - Yards, Roads and Fencing (Lichtenheld)

Excavation	150 c.y.
Curb removal	600 L.F.
Remove existing asphalt paving	1,200 s.y.
Backfill, compacted (in place)	300 c.y.
Asphalt paving, 3" asphalt and 9" gravel	800 s.y.
Curbs, WGK std. (modified A8.3 STD 9, Figure 3)	760 L.F.
Replace asphalt paving (road)	1,400 s.y.
Fencing, vinyl clad, with 3 strands barb wire and 2 locked 3' gates	30 L.F.

Category 18 - Railroads (Lichtenheld)

Steel rail crossing (30 L.F. with switch)	1 ea.
Rail crossing removal (timber) 9' x 80 L.F.	2 ea.

Category 19 - Insulation - (Lichtenheld)
None required.

Category 20 - Painting - (Lichtenheld)
Paint 8 x 8 x 8 concrete block building per Monsanto standards:
Inside -
Outside -

Category 21 - Walls, Masonry Roofs & Roofing (Lichtenheld)
8' x 8' x 8' high concrete block building with 4" poured concrete roof.

Category 22 - Spares (Lichtenheld)
None required.

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Notes to estimator (Estock)

Categories 50, 51, 53, 55, 58 & 67 (By Murphy, Estock)
Work up from "zero base" indirects estimate.

Category 80 - Engineering
Work up from manhour and travel estimate from each discipline.

Category 81 - Outside Engineering
Provide allowance for outside consultation (Say $20k).

Category 90 - Dismantling
Provide a small allowance for unknowns. No major dismantling required.

Category 91 - Sales and Use Taxes (Estock)

Category 92 - Repairs Expense
Normal allowance.

Category 93 - Relocation & Modification Expense (Harber, Estock)
Relocate existing liquid sampler.
Relocate existing flow instrumentation.
Relocate existing CED fab shop to Lot A. (See Dwg. CX-1-A).

Category 94 - Startup Relocation & Modification Expense
Put the following in capital categories as distinct items

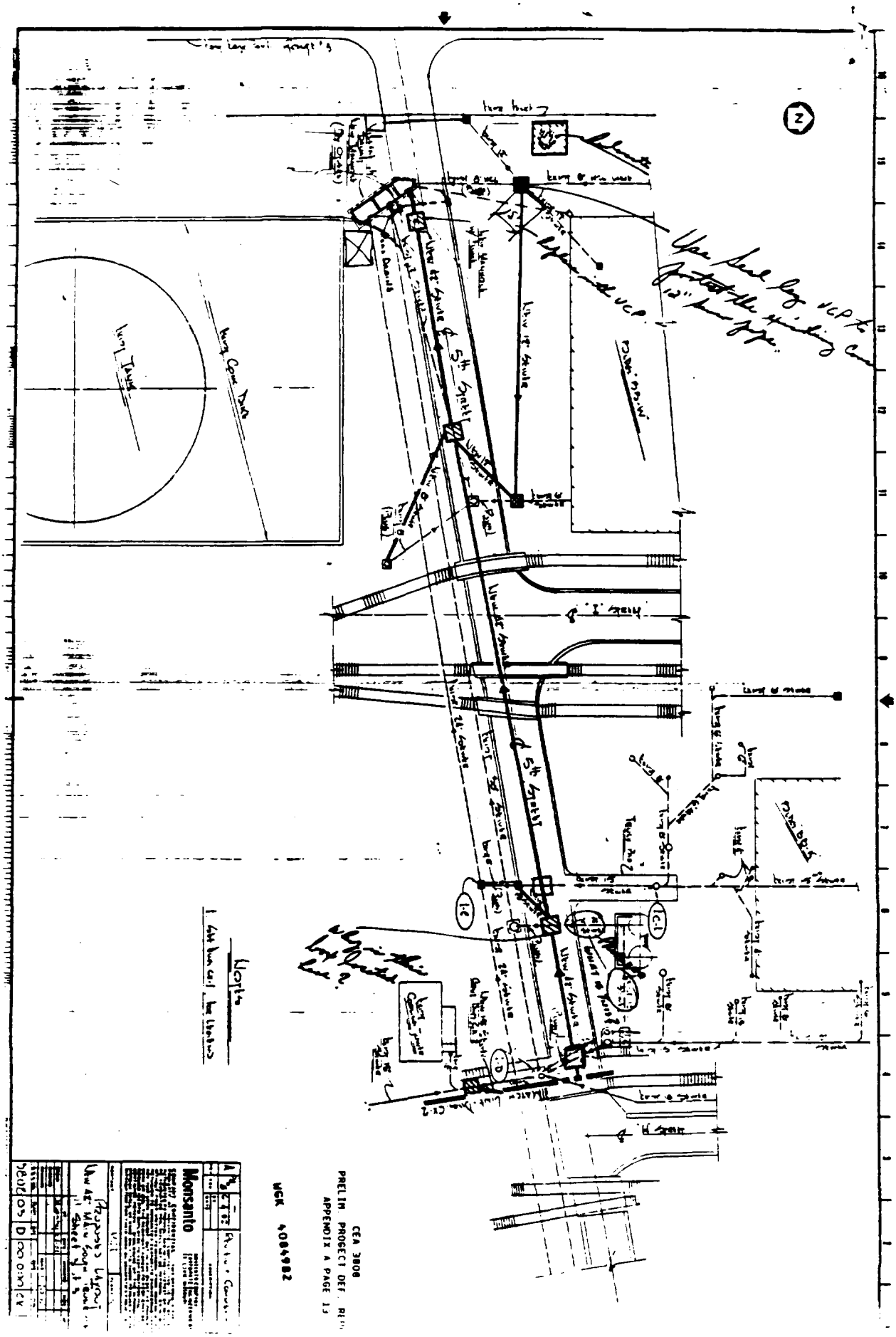
Provide allowances for plugging off sewers and pumping or siphoning around sewer sections during tie-ins.

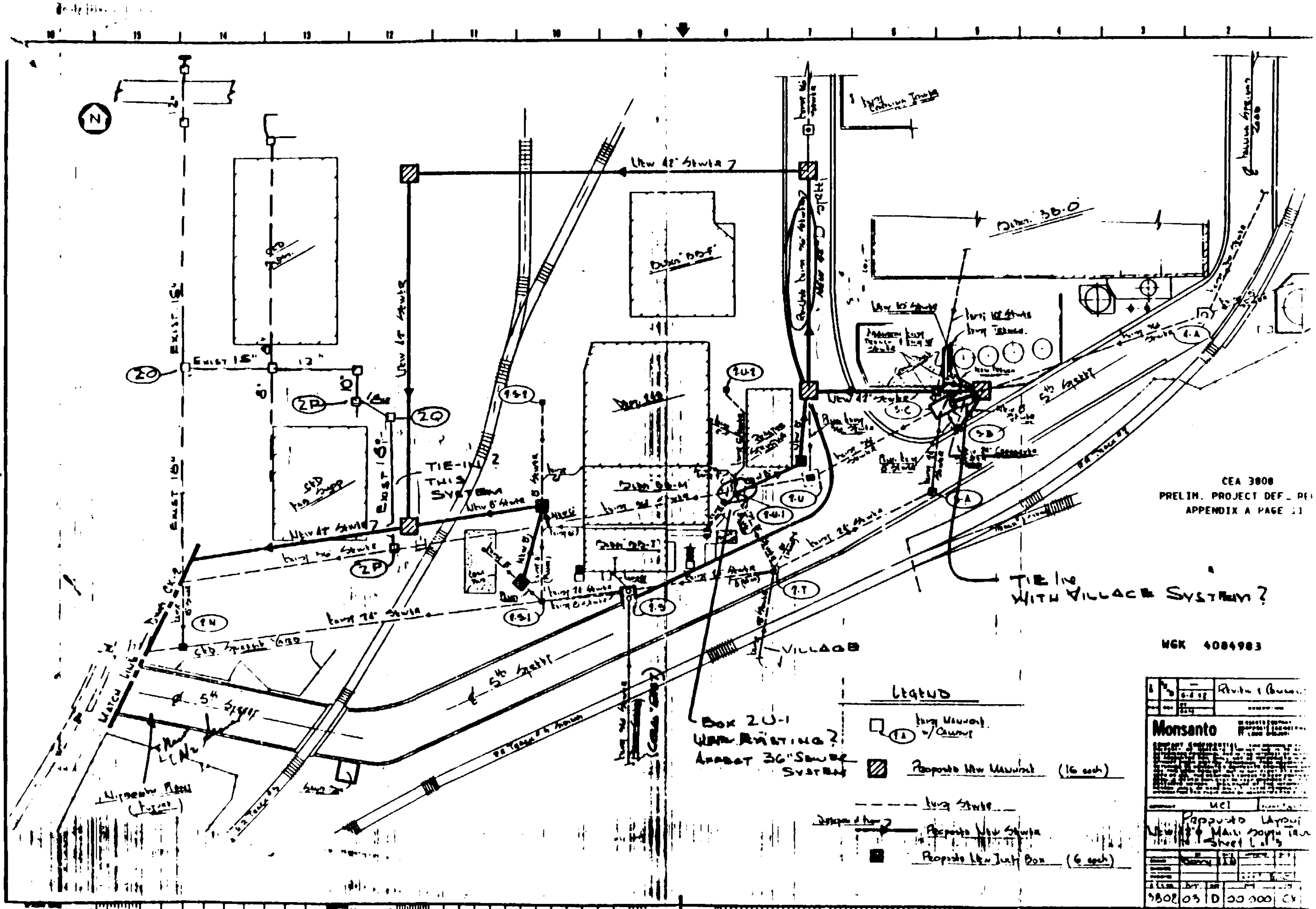
Hydrostatic testing.

Dewatering wells and operating costs (Note: Put expected dewatering in capital category such as Category 15. Allowance for extraordinary dewatering [risk items] should have allowances in undeveloped design. This includes highly acidic pumping).

Expense - use an allowance.

WGK 4084981





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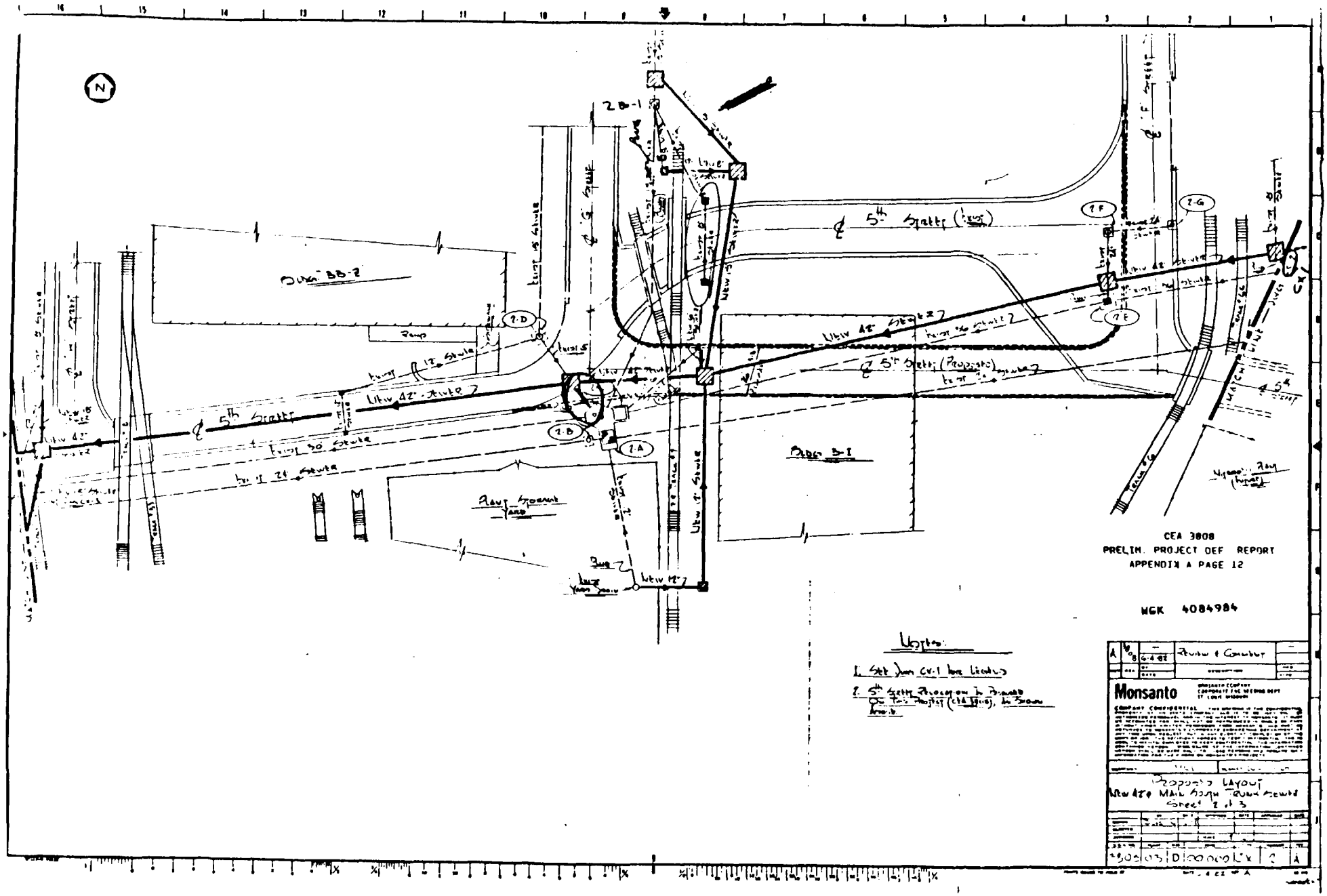

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